Sol y Agua Project: Enhancing Middle School Education through Computing with an Emphasis on Simulation and Data Science

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Abstract

Sol y Agua is an educational game created for middle-school students and centered on planning the design of a park. The game teaches them about water sustainability, and complementary environmental issues relating to the relationship between the people living in the Southwestern United States region, and the environment's availability of water. The game aims at motivating students to develop an environmentally conscious mindset as well as inspiring them to pursue STEM (Science Technology Engineering and Mathematics) disciplines. The game utilizes the Texas Essential Knowledge and Skills Standards (TEKS) [1] to ensure academic relevancy to the classroom. The game has an emphasis in promoting the demographic of this area and minorities towards developing careers in STEM, where they are largely underrepresented.

Approach

The game reinforces:
- Data-analytical skills
- Decision-making skills
- Socio-educational skills

The game makes use of simulations to augment and complement classroom lessons
- Students will be able to make predictions and conclusions using data visualization
- Students can make informed decisions equipped with knowledge gained from the data
- The game gives access to real-world data, breaking the spatial limitations of the classroom

Results

- Decision Making—Students are challenged to integrate knowledge to choose the most efficient landscape items for park design.
- Information Overload—Students will be exposed to a variety of information sources, from which they will need to obtain relevant information.
- Data Visualization—Students will be able to access various forms of data visualization to help with the information overload.
- Data Analysis—Students will be able to generate conclusions and gather relevant data by using data analysis.
- Data Interaction—Students will interact with real-time data to make informed decisions.
- Information Evolution—Students will be able to discern changes in data across time.

Future Work

- Project is in Prototype Stage.
- Educators will conduct Beta Testing in the classrooms.
- Evaluators will collect feedback and usage data from students and educators.
- Development team will modify game based on evaluations.
- The development team will incorporate new activities derived from the TEKS standards.
- The development team will evaluate the possibility of expansion to other regions and other languages.

Acknowledgements and References

The project team would like to thank the Smithsonian Latino Center and the following UTEP contributors:
- Dr. Ann Gates, project supervisor and Director of CYBER-Share Center of Excellence,
- Mary K. Roy, Dr. Monika Akbar, and Victor Reyes from the CYBER-Share Center,
- Dr. Daniel Tillman and Dr. Sang An from the Department of Education,
- Stacey Fox, Smithsonian Latino Center Instructional Designer/Artist.

References: